Warren (J. C.)

TUMORS OF THE BREAST

BY

J. COLLINS WARREN, M.D., LL.D.

PROFESSOR OF SURGERY IN HARVARD UNIVERSITY

Reprinted from the Boston Medical and Surgical Journal of November 12 and 19, 1896, and January 21, 1897

BOSTON
DAMRELL & UPHAM, PUBLISHERS
283 Washington Street
1897

THE RESULTS OF OPERATIONS FOR THE CURE OF CANCER OF THE BREAST.[1]

BY J. COLLINS WARREN, M.D., LL.D.,
Professor of Surgery in Harvard University.

THE belief in former times that cancer of the breast was an incurable disease was doubtless well grounded, owing to the inadequacy of the operations then performed. Cures were so rare as to be curiosities. This feeling was expressed by no less an authority than Sir James Paget, who says: "I am not aware of a single clear instance of recovery — of such recovery, that is, as that the patient should live for more than ten years free from the disease."

The development of the modern operation has convinced most surgeons that this opinion no longer holds good; but I think it is safe to say that there are quite a number that are still unconvinced, and the belief is still quite prevalent among the profession at large that there are few more discouraging cases for operation than these. This belief is still encouraged — I might say authorized — by the very unsatisfactory operations which are frequently performed by practitioners without due surgical training.

It is now about fifteen years since attention was called to the necessity of a dissection of the axilla by Volkmann, and to the importance of removing the fascia of the pectoralis major muscle by Haidenhain. Mitchell Banks in England and S. W. Gross in this country were also pioneers in the new methods of operation. The recent work of Halsted shows the advantage to be derived from a removal of one or both pectoral muscles, and of exploration of the infra- and supra-clavicular regions.

[1] Read before the Boston Society for Medical Improvement, May 4, 1896.

The prominence which has been given to the axilla as a strategic point in fighting the disease has drawn attention away from the importance of removing more superficial structure. The integuments of the mamma are, however, richly endowed with lymphatics, and are exposed to early infection from the primary focus. The flaps of skin which are left are, therefore, in many cases within the infected area, and are a frequent source of "recurrence." A sufficiently wide sweep of the knife around this organ will usually remove this area, but an open wound is left. The surgeon, therefore, yields to the temptation to save enough integument to obtain union by first intention. As a result, we have more frequent recurrence in the pectoral than in the axillary region; indeed, it is to me surprising to find how effectual a clean dissection of the axilla is against the return of the disease in that particular locality.

It is obvious that a knowledge of the anatomy and development of the mammary gland will assist the surgeon in a proper comprehension of the points of origin and spread of cancer.

The mammary gland is an appendage of the skin, a sort of highly specialized sudoriparous gland. It begins as a growth of the rete Malpighii into the cutis vera in the early weeks of fetal life, and at the period of birth it has already formed a number of radiating tubes with club-shaped ends. In the embryo of the pig at about one month, a faint continuous line, the "milk line," may be found running from axilla to groin on either side of the abdominal parietes. By a process of differentiation a thickening occurs at certain points, and thus a row of nipples are developed, and such changes when initiated in the human subject may develop supernumerary nipples, and fragments of supernumerary gland tissue may also be formed at the same

time. These para-mammary glands are occasionally the starting-point of a cancerous growth.

The area covered by the mammary gland extends from about the third to the seventh rib in a vertical direction, and from the margin of the pectoralis major to a little beyond the line of the sternum laterally. The gland is not a hemisphere, as usually supposed. Its border is not circular, but three-cornered, one angle or prolongation extending towards the axilla, another in the direction of the serratus magnus, and a third projects towards the median line in the neighborhood of the sternum. The nipple is not at the centre, but rather nearer the upper and inner quadrant. From the skin over the breast there are sent down certain fibrous prolongations to the gland stroma. These have been described by Sir Astley Cooper as the suspensory ligaments of the gland. It is the retraction of these ligaments which gives rise to the peculiar dimpling of the skin over the growth so characteristic of cancer.

There are two layers of lymphatics running from the gland to the large trunks. The most important of these is the superficial layer. The vessels of this layer form a rich anastomosis immediately under the nipple and finally combine to form two or three large trunks. One of them may be seen traversing the upper and outer quadrant; another takes its origin from the lower and outer quadrant; while a third sweeps around the lower border of the gland from its inner hemisphere. These vessels are exceedingly superficial, and receive branches directly from the skin and subcutaneous tissues, and the region occupied by this plexus is readily infected from the original focus.

The deeper layer follows the fascia of the pectoralis major muscle, and the plexus in this fascia receives branches from the muscle itself. This fascia and its

prolongations constitute suspicious soil, and must be removed in every case of operation for malignant disease. A certain number of lymphatic vessels penetrate the submammary tissues and finally pierce the intercostal spaces, uniting with the chain of lymphatics which run along the course of the internal mammary artery, and anastomose with a plexus distributed over the surface of the diaphragm. Tiffany has, in several cases, resected a portion of the rib, and has removed infected sternal glands. This I have also done in one case.

The first group of axillary glands met with lies beneath the outer border of the pectoralis muscle, and receives the large vessels described above. The subscapular group of glands receive lymphatics from the arm principally. The vessels passing through these two clusters unite at the point of the axillary group of glands, and these glands in their turn communicate with the subclavian glands. The principal nerves met with are the long thoracic, the external respiratory nerve of Bell, and one or two subscapular nerves. Several of these nerves may be divided without causing permanent impairment of the muscular action of the shoulder-joint. The intercosto-humeral nerves, distributed as they are to the thorax on one side of the axilla and to the inner surface of the arm on the other, play an important part in those painful neuralgias which are found both before and after operation.

The operation which I perform at the present time has gradually been developed from the so-called "completed operation," by which was meant not only the removal of the mammary gland with a more or less abundant amount of integument, but also a free dissection of the axilla. It comprises a removal of the gland and para-mammary tissue and the integuments in sufficient amount to include the superficial

lymphatic vessels which, as has been shown, spring from the various quadrants and run towards the margin of the pectoralis major muscle; a removal in all cases of the sternal portion of the pectoralis major muscle, division of the pectoralis minor muscle, and occasionally removal of the muscle, dissection of the axilla and the infra-clavicular space; exploration in many cases of the supra-clavicular region.

The details of the operation are as follows: An incision is made from the outer margin of the axilla along its anterior border, and along the line of the pectoralis major muscle, following the outer and lower margin of the breast, to a point on the boundary line of the inner and lower quadrant. A second incision is made along the upper margin of the breast, beginning at about the middle portion of the axillary incision, and gradually diverges from the lower incision so as to sweep through the middle of the upper inner quadrant and the inner portion of the inner lower quadrant. Such incisions form a pear-shaped figure which includes all of the outer hemisphere and the greater portion of the inner hemisphere. A third incision is made at right angles to the upper incision at the point where the axillary vessels lie, and reaches as far as or beyond the clavicle. After reflecting back the integument so as to expose the mammary gland and paramammary fat and the axillary region, the knife is carried down to the pectoralis major, the sternal insertion of which is now divided. This enables the operator to throw the mass to be removed outward, the muscle being divided near its insertion into the humerus. The pectoralis minor is next divided, and the dissection of the axilla follows, from above on both sides downward, the large vessels being carefully cleansed of all loose tissue. As the dissection proceeds the breast and adnexa are gradually separated from the chest wall and removed in one continuous mass.

In dissecting the axilla especial attention should be paid to a prolongation of adipose tissue which accompanies the blood-vessels to the point where they dip beneath the clavicle, and also a similar tongue of tissue which runs behind them. A thin, blade-like mass of fatty tissue lying between the serratus magnus and the subscapularis should also receive the attention of the operator, for here numerous small, shot-like glands are found in specially malignant forms of the disease.

If the dissection of the axilla shows a general infection of the glands, then the third incision through the integuments should be continued above the clavicle along the posterior margin of the sterno-mastoid muscles and the supra-clavicular glands found lying in the posterior cervical triangle should be removed. If numerous they should be traced down behind the clavicle so that the forefingers introduced above and below that bone can easily meet behind it. Such a dissection is rarely necessary as the glands found above the clavicle are comparatively rarely infected at the period during which the disease is attacked. Division of the clavicle does not add materially to the exposure of the region and prolongs the operation, and should therefore be reserved for exceptional cases.

The amount of integument that has been removed will prevent the complete closure of the lower and inner portion of the wound. The custom of leaving this to granulate seems to me a measure which prolongs convalescence and often shocks the sensibilities of the patient, already sufficiently disturbed. Tiersch grafting is not an æsthetic manner of closing the defect, and is not always to be relied upon to cover-in every spot of exposed wound surface.

In my later operations I have consequently resorted to a plastic operation which consists in turning into the exposed space two symmetrical horizontal flaps

from below and bringing the edges of the area thus denuded together in a vertical line, so that we have when the operation is finished a vertical incision extending down from the middle of the closed area towards the iliac crest in the shape of a cross. This enables the surgeon to remove all the infected tissue, and at the same time to obtain union by first intention.

A careful attention to hemostasis protects from shock and enables the surgeon to make this extensive dissection deliberately. An operation which has been completed within the hour is probably inadequate; on the other hand, a prolongation of the operation beyond the limit of two hours is fraught with danger, as the chances of shock and sepsis are thereby sensibly increased.

The operation should be performed by one man from beginning to end: by this I mean that the custom of leaving many details to an assistant does not give the patient the benefit of that continuous attention which the operation demands, and is her right. The material of which sutures and ligatures are composed is unimportant provided they are aseptic. It is unnecessary to apply deep or buried sutures. A small strand of sterilized gauze should be inserted near the axillary margin of the wound to drain off the lymph serum which flows so abundantly from the wounded lymphatics during the first twenty-four hours. This should be removed on the second day and the provisional suture, left there for the purpose, tied.

A voluminous aseptic dressing should be applied, and the outer layers should include the arm and shoulder. The dressing is opened on the second day in order to withdraw the gauze drain. It adds greatly to the patient's comfort to change the inner layers, placing cool, fresh gauze next the skin. No further change is necessary until the stitches are removed.

This may begin on the fifth day. It is well to replace the sutures with strips of crèpe lisse held in place by collodion.

The accompanying tables are compiled from cases operated upon in hospital and private practice and contain those only which have undergone a more or less radical operation and in which the diagnosis of cancer has been made by competent authority. In all cases, except two, microscopical examinations were made; and in these two cases (operated upon at some distance in the country), the diagnosis of cancer was considered by me so unquestionable that the specimen was not preserved.

In 92 consecutive cases in which the operation has been performed, there were but two deaths (both hospital cases), one from erysipelas and one from Bright's disease. The death from erysipelas, occurring many years ago, was due to contagion from hospital bedding, the patient having been placed for three days prior to the operation in a bed formerly occupied by a patient with erysipelas. The other fatal case was one in which an operation had been performed for palliative purposes chiefly to relieve the patient from the suffering caused by the presence of a large ulcerated carcinoma.

This gives a mortality of but a little over two per cent. That the completed operation is essential is shown from the fact that in three cases only were the lymphatic glands of the axilla found to be non-infected.

The tables include only those cases in which it was possible to obtain a subsequent history. One or two cases have been rejected as throwing no light upon the value of the modern operation. Two were taken from the list (one a male), as several incomplete operations had been already performed upon them be-

fore entering the hospital. Another case was rejected, as death occurred from erysipelas several months after leaving the hospital. Still another case is not given, in which it was considered advisable to perform a palliative operation and several infected glands were allowed to remain untouched.

With these exceptions and those not heard from, the series of cases is as nearly as possible a consecutive one.

Taking three years as the period which it is generally considered as necessary to elapse in order to pronounce the case cured, we have 42 cases, with 11 alive and well, or 26 per cent. This includes the two fatal cases. Leaving these out of the calculation, we have 40 cases with 11 cures, or a percentage of 27.

There are 15 alive and well without recurrence at the end of two years, which gives a percentage of 30; or, again, omitting the two deaths from operation, 31 per cent. In this series of successful cases two are omitted in which a recurrence took place, but the patients are alive and well at the present time. In one (No. 34) the original operation was performed on January 1, 1893, and a recurrent nodule was removed in November, 1894; since then the patient has been well. In the second case the operation was performed in 1885 (No. 4); a nodule was removed in 1894. The patient reports herself well in February, 1896. Such a case strongly suggests the possibility of a new infection starting from a para-mammary gland.

In a series of 28 consecutive cases in my private practice there are 14 alive and well at the present time. Billroth asserts that a patient who has lived a year after the operation, and, after an examination by a competent surgeon, is pronounced free from recurrence, can be regarded as cured. In very many of the cases in which recurrence is said to have occurred

at a later date, the nodule has doubtless been overlooked. In 33 cases in which the date of the recurrence was noted, it was found that the disease reappeared on an average in fourteen months after the operation. In the great majority of cases in which recurrence occurs, the nodule can be discovered by a careful examination as early as one year after the operation.

Volkmann's law may be thus stated: If there has been no return of the disease one year after the operation, a cure can be hoped for; if the patient continues well at the end of two years, a cure is probable; and if well at the end of three years, the cure may be regarded as certain. The average duration of life in 28 cases in which death occurred from a return of the disease was thirty-two months.

In regard to the locality of the recurrence, the figures are very suggestive. In 27 cases in which this point was noted, the disease reappeared in the pectoral region in 15; at the margin of the axilla, in 2; in both pectoral regions and axilla, in 4; in the sternum, in 2; and in the opposite breast, in 1. Death without local recurrence is noted in 3 cases. The average age at which the disease appeared in 63 cases was forty-nine years. The oldest was seventy-two, the youngest twenty-two. There were 25 between fifty and sixty, 9 between sixty and seventy, 21 between forty and fifty, 6 between thirty and forty, and 27 between forty-five and fifty-five years of age. There were 16 single and 47 married.

There were two cases in which the disease developed from a benign tumor. In No. 39 the cancerous growth was found to have started in a chronic mammary tumor, or fibroma, which the patient had had for over twenty years.

In a second case the disease had clearly originated

in the centre of a mass of connective-tissue growth produced by a chronic mastitis. In this case one small gland was found in the axilla, but the microscope showed that it was not infected.

There were two cases of "cancer of the axillary border." This is a term which I have applied to a certain form of cancer of this region which begins as a lenticular nodule in the skin at the point mentioned. It remains for a long time quite localized, but eventually involves the breast and axilla. On one occasion I have had the opportunity of operating upon the disease before it had attacked the breast. An exploration of the axilla in this case showed that no infected glands existed. The case is not reported in the following series, as the breast was not affected. The patient has had no recurrence and at the time of writing two years have elapsed since the operation. Nos. 40 and 45 are both examples of this disease, and, as will be seen by reference to them, in one case death occurred from recurrence in the spine. The disease in its early stages presents the appearance of epidermoid cancer, and the appearance of the primary nodule in Case 45 was not unlike that of rodent ulcer. No ulceration existed, but the nodule had a cicatricial and depressed centre with a raised and pearly margin. This type of case, so far as I know, has not before been described. It seems to deserve to be placed in a special group, as, although at first extremely benign and capable of cure, it is liable to rival the malignant forms of cancer of the breast.

Case I. This patient, forty-five years old and single, was operated upon July 30, 1883. There was nothing in her family history suggestive of malignant disease, and no assignable cause for her own malady, which had existed for three years and seven months.

At the time of operation the nipple was retracted, and no glands were found in the axilla. The breast was removed and the growth found to be a colloid cancer. In July, 1888, the axilla was dissected, and a nodule the size of a hen's egg removed. When last heard from, in May, 1895, she was well.

Case II. Operation in June, 1884. The patient was sixty years of age, single, with a negative family history, and no cause known for the disease which had begun about three years before. At the time of operation a soft nodule about the size of an English walnut, was found in the inner hemisphere of the breast, and no glands were apparent in the axilla. The breast was removed and the axilla explored. The diagnosis was cancer. This patient died of apoplexy January 8, 1894, having had no recurrence.

Case III. A single woman, age forty, with the following family history: Her maternal grandmother died of cancer of both breasts; a maternal aunt died of cancer of the breast; a maternal cousin, of cancer of the rectum; and a paternal aunt had cancer of the breast. There was no cause assigned for this growth, which appeared about a year before. At the time of operation there was a nodule in the outer hemisphere adherent to the skin. No glands were felt in the axilla. She was operated upon in December, 1884; the breast was removed and a small infected gland dissected from the axilla. The tumor proved to be a scirrhus growth. On April 2, 1895, she writes, "Am in perfect state of repair."

Case IV. Operated on March 24, 1885. Patient sixty years of age, married, with a negative family history. There was no cause assignable for her trouble, which began about two months before the operation. Examination showed a lump in the upper, inner quadrant of the breast, the size of an egg. The

breast was removed and the axilla dissected. The report of the pathologist's examination of the original tumor unfortunately was lost; but in February, 1894, a recurrent nodule, the size of a pigeon's egg, was removed from below and outside the centre of the scar; and this, which was of two months' duration, was found to be cancer. She was heard from in February, 1896, and was free from recurrence. A case of new infection in a para-mammary gland?

Case V. In this case the disease had existed for two months, in a married woman of sixty-five, with a negative family history, and without any known cause. At the time of operation, July, 1885, there was found extensive disease of the breast and axilla. The breast was removed and the axilla dissected, the pathological diagnosis being cancer. She died July 25, 1891, of sporadic cholera, age seventy-one, and had had no recurrence.

Case VI. This patient was fifty-two years old and married. Her family history was negative, and there was no cause known for the disease, which had existed for six months. The skin was involved, there being rose-like outgrowths, and the glands in the axilla were enlarged to the size of a lemon. On November 6, 1886, the breast was removed and the axilla cleaned out. The tumor proved to be a medullary cancer. In March, 1889, she was reported to have a recurrence, the size of a small lemon, involving the skin and firmly adherent to the chest wall. No further report of this case has been received.

Case VII. Operated on January 29, 1887. The patient was a married woman, thirty-three years of age, and with a negative family history. There was nothing in the past history to suggest a cause for the disease, other than the occurrence of abscess of the breast during her first and second confinements. The

disease first appeared seven months before the operation, and the entire right breast was found firm and tense, the skin red and angry, and the axillary glands affected. She was also three and a half months pregnant. The breast was removed and the axilla dissected. The pathological diagnosis was cancer. April 24, 1887, she had a nodule, the size of an olive, at the border of the axilla. No further report has been received.

Case VIII. This patient was forty years of age, single, and with a negative family history. Her tumor was of six months' duration, and appeared without any assignable cause. At the time of operation, February 16, 1887, only a small nodule was apparent; but the skin was ulcerated, the nipple retracted, covered with dry scabs, and the axillary glands were enlarged. The breast was removed and the axilla dissected. The growth was cancer, and she had a recurrence in May, 1888, which was removed in July of the same year. She died October 24, 1889, with local recurrence.

Case IX. A widow, thirty-eight years old, with a negative family and personal history was operated upon March 1, 1887. The disease was of six months' duration, and at the time of operation presented a lump, the size of a walnut, in the left breast. The skin was not involved, and the tumor was movable on the muscle. One gland could be felt in the axilla. The breast, with the axillary contents, was removed, and the disease found to be cancer. She was well when last heard from — March, 1896.

Case X. This patient was forty years of age, married. Her family history presented nothing of interest, nor could any probable cause for her present trouble be ascertained. The disease had existed for four months, and at the time of operation had extended to

the clavicular glands. The original growth was in the outer hemisphere of the breast. On October 26, 1887, the breast and axillary contents were removed, and the disease found to be medullary cancer. She died of general cancerous infection in August, 1888.

Case XI. This patient was forty-three years of age, married, and without any significant family or past history. The disease had been noticed for a year, and at the time of operation, December 11, 1887, was the size of a small lemon in the centre of the breast. The axillary glands were enlarged. The breast was removed and a very careful dissection of the axilla made. This tumor was a medullary cancer. In August, 1889, she had recurrence of the disease in the sternum with internal metastases, and died in September, 1890.

Case XII. This was a married woman of forty-five. Her grandfather had cancer of the lip, and a sister died of rectal cancer. Seventeen years before coming under my care she had a broken breast, and since that time that breast had been larger than the other. The present trouble had been noticed for about a year, and at the time of operation formed a tumor the size of a lemon in the upper inner quadrant of the breast. The skin was adherent, and there were enlarged glands in the axilla, but none in the clavicular region. On January 9, 1888, the breast and a chain of enlarged glands extending along the vessels and under the pectoral muscles were removed. The pathologist found the tumor to be medullary cancer. The disease returned locally in June, 1889, and she died January 2, 1890.

Case XIII. Operated upon February 6, 1888. This patient was fifty years old, married, family history negative. She had had fifteen children, with an abscess in the breast now affected, after the first

child. Since that time she has been unable to nurse from that breast for longer than three weeks at a time. The present trouble is of three years' duration, and at the time of operation the breast was the size of a cocoa-nut, the skin was adherent and the nipple was much retracted, but the growth was movable on the muscle below. Small glands could be felt in the axilla. The breast was removed, and the axilla was merely explored, no glands being removed. The tumor was a scirrhus cancer. The disease recurred in the scar in seven weeks, and the patient died in five months.

Case XIV. In this case the disease had existed for six months in a single woman of fifty years. There was nothing in the family history suggesting malignant disease, nor was any cause known to the patient for her malady. She was operated upon October 11, 1888, at which time the breast contained a cyst with beginning cancer in the walls. The breast was removed, and the diagnosis confirmed by microscopical examination. No dissection of the axilla was made. She was last heard from in March, 1893, up to which time there had been no recurrence of the disease.

Case XV. This patient was fifty years of age, single, and with an unimportant family history. Her disease had begun eight months before operation with no discoverable cause, and appeared as a scirrhus nodule in the anterior axillary fold. There was one small gland in the axilla. On October 22, 1888, the breast was removed, and the axilla dissected. Microscopic examination showed the growth to be scirrhus cancer. She died August 14, 1893, probably of gastric cancer, but there had been no local recurrence of the disease.

Case XVI. This patient was fifty years old, sin-

SUMMARY OF SIXTY-TWO CASES OF CANCER OF THE FEMALE BREAST.

No.	Date of Operation.	Diagnosis.	Recurrence, date and place.	Alive and well.	Death, date and cause.
1	July 30, 1883.	Colloid cancer.	July, 1888, nodule removed from axilla.	May, 1895.	
2	June, 1884.	Cancer.	None.	....	Jan. 8, 1894, of apoplexy.
3	Dec., 1884.	Scirrhus.	....	April 2, 1895.	
4	Mar. 24, 1885.	Cancer.	Nodule removed Feb., 1894, below and outside scar.	Feb. 26, 1896.	
5	July, 1885.	Cancer.	None.	....	July 25, 1891, sporadic cholera.
6	Nov. 6, 1886.	Medullary cancer.	March, 1889, skin of chest wall.		
7	Jan. 29, 1887.	Cancer.	April 24, 1887, border of axilla.		
8	Feb. 16, 1887.	Cancer.	May, 1888, removed in July, 1888.	....	Oct. 24, 1889, of local recurrence.
9	Mar. 1, 1887.	Cancer.	....	Mar., 1896.	
10	Oct. 26, 1887.	Medullary cancer.	....	....	Aug., 1888, of general cancerous infection.
11	Dec. 11, 1887.	Medullary cancer.	August, 1889, sternum and internal.	....	Sept. 1890, of original disease.
12	Jan. 8, 1888.	Medullary cancer.	June, 1889, local.	....	Jan. 2, 1890.
13	Feb. 6, 1888.	Scirrhus.	Seven weeks later in the cicatrix.	....	Five months after operation.
14	Oct. 11, 1888.	Cancer.	....	Mar., 1893.	
15	Oct. 22, 1888.	Scirrhus.	None locally.	....	Aug. 14, 1893, probably of gastric cancer.
16	Jan. 5, 1889.	Medullary cancer.	....	... .	Dec. 15, 1892, fractured hip with tumor, tumor of sternum.
17	Jan. 9, 1889.	Medullary cancer.	Sept. 4, 1889, recurrence removed above scar. Feb. 21, 1890, recurrence removed beneath scar.		
18	Jan. 25, 1889.	Cancer.	Nov. 4, '89, nodule excised from scar.	....	Two years later with recurrence.
19	Feb. 9, 1889.	Cancer.	....	June, 1895.	
20	Feb. 19, 1889.	Medullary cancer.	....	....	Sept. 26, 1890, generalized cancer. *Cancer en cuirrasse.*
21	April 8, 1889.	Medullary cancer.	Autumn, 1889, local.	....	July, 1890, generalized cancer.
22	Aug. 7, 1889.	Scirrhus.	Three months later, locally.	....	Nov. 22, 1889.
23	Nov. 1, 1889.	Cancer.	May, '90, recurrence removed, Oct. '90, recurrence.	....	May, 1891.
24	Nov. 4, 1889.	None made.	1891, recurrence in cicatrix.	....	May, 1895, fungating recurrence in axilla.
25	Dec. 27, 1889.	Cancer.	Nine months in other breast, later in scar.	....	May, 1893, cancer of stomach.
26	Jan. 2, 1890.	Cancer.	Local in autumn of 1892.	....	Aug., 1893, recurrence in breasts, neck and abdomen.
27	Jan. 16, 1890.	Cancer.	None.	....	Feb. 1, 1891, no local recurrence.
28	Mar. 5, 1890.	Scirrhus.	Locally recurred.	....	Oct., 1891.
29	Nov. 9, 1891.	None made.	....	....	May, 1892.
30	Feb., 1892.	Medullary cancer.	....	....	Oct. 14, 1892.
31	Oct., 1892.	Medullary cancer.	June, 1893.	....	May 22, 1894, generalized cancer.
32	Nov. 4, 1892.	Cancer.	June, 1893, local.	... .	June, 1894.
33	Nov. 7, 1892.	Cancer.	....	April, 1896.	
34	Jan. 1, 1893.	Medullary cancer.	Nov. 26, '94, nodules removed from outer side chest.	Jan., 1896.	
35	Jan. 18, 1893.	Scirrhus.	Jan. 7, 1895, in scar and liver.		
36	Feb. 21, 1893.	Cancer.	....	Mar., 1896.	
37	April 18, 1893.	Scirrhus.	....	April, 1896.	
38	June 8, 1893.	Scirrhus. Both breasts.	Below and external to right cicatrix.	....	March, 1894, lung metastases.
39	June 12, 1893.	Medullary cancer.	Local and in lungs.	....	March, 1894, local and pulmonary recurrence.
40	Sept. 11, 1893.	Scirrhus.	....	Oct., 1896.	
41	Jan. 1, 1894.	Disseminated med. cancer.	Six months, locally, and May, '95, supra-clavicular.	....	June 9, 1895.
42	Jan. 20, 1894.	Scirrhus.	....	Mar. 6, 1896.	
43	Jan. 30, 1894.	Scirrhus.	....	....	July 20, 1894, wound never healed.
44	Feb. 3, 1894.	Medullary cancer.	....	Oct., 1896.	
45	Feb. 8, 1894.	Scirrhus.	....	... .	Aug., 1895, spinal cancer.
46	Feb. 14, 1894.	Medullary cancer.	....	....	June 9, 1894, generalized cancer.
47	Feb. 17, 1894.	Medullary cancer.	One month, local.	....	Two months after operation, pulmonary involvement.
48	July 20, 1894.	Medullary cancer.	....	Oct., 1896.	
49	Oct. 3, 1894.	Epithelial growth in dense fibrous stroma.	Jan., '96, nodule removed from margin of axilla and pectoral scar.	....	Mar. 26, 1896.
50	Nov. 3, 1894.	Medullary cancer.	Aug. 23, '95, removed from pectoral margin of axilla, Oct., '96, nodule in rib.		
51	Dec. 15, 1894.	Scirrhus.	Sore opened twice and healed.	May 18, 1895.	
52	Jan. 22, 1895.	Scirrhus in chronic mastitis with retention cyst.	....	Jan., 1896.	
53	Jan. 22, 1895.	Cancer.	....	April 28, 1896.	
54	Mar. 28, 1895.	Scirrhus.	... .	Oct., 1896.	
55	April 3, 1895.	Medullary cancer.	Feb. 21, '96, pectoral scar and skin-nodules removed.		
56	Aug. 24, 1895.	Medullary cancer.	Recurrence in sternal gland, June, '96, anterior mediastinum opened, gland removed.	Sept., 1896.	
57	Sept. 24, 1895.	Scirrhus.	....	Nov., 1896.	
58	Oct. 19, 1895.	Atrophying scirr.	... .	Nov., 1896.	
59	Nov. 25, 1895.	Medullary cancer.	Immediate, skin excised two weeks later.	....	Jan., 1896.
60	Dec. 27, 1895.	Medullary cancer.	....	Nov., 1896.	
61	Jan. 3, 1896.	Medullary cancer.	June, 1896, brawny swelling on shoulder.		
62	Jan. 27, 1896.	Medullary cancer. Axillary glands not infected.	....	Sept. 11, 1896.	

gle, and her family history was not of interest. No cause was assigned for the disease, which began several months before. The patient was insane. At the time of operation the tumor was the size of a lemon, the skin not adherent, and the axillary glands enlarged. On January 5, 1889, the breast was removed, with the glands. The pectoralis muscle was separated at the clavicular portion, and glands removed through this space. The axilla was dissected below. The tumor was a medullary cancer. She died December 15, 1892, after fracture of the neck of the femur. At the autopsy a tumor, two and one-half inches in diameter, was removed from the sternum. There was a cheesy tumor about the right hip, which it was thought might be of a cancerous nature.

Case XVII. This case was operated upon January 9, 1889. The patient was fifty-seven years of age, married; her grandmother died of cancer of the breast. She had mastitis thirty-one years ago; seven years ago, Paget's disease; and the nipple was removed six years ago. The present disease was first noticed eight months ago, and at the time of operation, appeared as a nodule the size of a walnut, surrounded by infiltration, but not adherent to the skin. The axillary glands were enlarged. The breast was amputated, and two small glands, which were all that could be found, were removed from the axilla. The tumor was medullary cancer. September 4, 1889, a recurrence, the size of a filbert, was removed from above the scar. February 21, 1890, another recurrence was removed from beneath the scar. There has been no further report.

Case XVIII. This patient was a single woman of only twenty-two years. There was no history suggesting heredity or cause. Eight years ago she noticed enlarged glands above the clavicle; and the

present growth was first seen three months ago, with coincident glandular enlargement in the axilla. She was operated upon January 25, 1889, at which time the tumor was the size of a small apple, very hard, and the gland in the axilla was the size of a walnut. The breast and pectoral fascia were removed, and the axilla was very thoroughly cleaned out. The diagnosis was cancer. November 4, 1889, a nodule was excised from the scar. She died in two years with recurrence of the disease.

Case XIX. This patient was fifty-two years old and married. There was nothing in her family or personal history of interest. Her present illness dates back ten months, and at the time of operation, February 9, 1889, the tumor formed a hard nodulated mass, the size of a small orange. The skin was not adherent, and in the axilla some enlarged glands could vaguely be felt. The breast was removed and the axilla carefully cleaned. The tumor from the breast was cancer, but no report was received concerning the axillary glands. She was examined by me in June, 1895, and no sign of recurrence found.

Case XX. This case was operated upon February 19, 1889. The patient was married, forty-one years old, and her family and past personal history presented nothing characteristic. The disease of the breast was of one year's duration and appeared as disseminated disease with infected glands extending from the axilla up to the clavicle. The breast was excised, with the axillary glands, and the disease found to be medullary cancer. This was a case of *cancer en cuirasse*, and the patient died of generalized cancer on September 26, 1890.

Case XXI. This patient was forty-five years of age, and was operated upon April 8, 1889. She was married. There was nothing of note in her family or

past history. The tumor which had existed for three months appeared as a nodule about as large as a small egg in the periphery of the breast. Enlarged glands could be felt in the axilla. The breast was amputated and the axillary contents removed, the growth proving to be a medullary cancer. Local recurrence appeared in the following autumn, and the patient died in July, 1890, with generalized cancer.

Case XXII. Married, forty-five years old, with no family history to suggest heredity, and no assignable cause for the disease, which had existed for only two months. On August 7, 1889, the date of operation, she had a lump as big as an English walnut in the upper hemisphere of the breast, and the axillary glands apparently were unaffected. The usual excision of the breast, with dissection of the axilla, was performed, and the growth found to be scirrhus cancer. There was local return in three months, and she died November 22d of the same year.

Case XXIII. Operated on November 1, 1889. The patient was fifty-eight years of age and married. Her family history was negative. She had had eight children, and twenty-eight years ago had mastitis. The present trouble appeared three years ago, and at the time of operation showed retraction of the nipple, with the skin adherent. The growth had been slow until the past two months, since which time the tumor had enlarged quite rapidly to the size of an orange, and had become ulcerated. The breast was removed, and the axilla carefully cleaned of its glands, many of which were adherent to the vessels. The tumor was a cancer. In May, 1890, a recurrent growth was removed; in October, 1890, there was inoperable recurrence; and she died in May, 1891.

Case XXIV. This patient was fifty-nine years old, married, and the mother of three children. Her

family history was negative. Four years ago she injured the breast now the seat of disease. Two years after the injury she noticed a lump in the breast, which at the time of operation formed a tumor as large as a lemon. The breast was flattened, the skin puckered, and the nipple retracted. Enlarged glands were to be felt in the axilla. On November 4, 1889, the breast and a number of enlarged glands were removed. No pathological diagnosis was made. She was well on January 1, 1891; but later a small lump appeared in the cicatrix without palpable enlargement of the axillary contents. She died May, 1895, with fungating recurrence in the axilla.

Case XXV. Operation on December 27, 1889. The patient was forty-seven years old, married, and had had six children. Her family history was negative and she had no idea as to the cause of her malady, which appeared nine months ago as a small lump. In the past month growth has been rapid and attended with pain. At the time of operation there was a nodular mass as large as a small orange in the breast, the skin was adherent, and the nipple retracted. The axillary glands were palpably enlarged. The breast was removed, together with the pectoral fascia, and the axilla apparently fully cleaned out. The growth was cancer, and nine months later appeared in the other breast. She was treated for six months by an irregular practitioner, had recurrence in the scar, and died in May, 1893, of cancer of the stomach.

Case XXVI. This case was operated on January 2, 1890. The patient was married, forty years of age, and fourteen months before operation noticed a lump as large as a hen's egg in the left breast. An aunt died of cancer of the breast, but otherwise her history was negative. The breast contained a mass as large as an orange, hard, nodular, and movable. The

skin was adherent and the nipple retracted. A hard cord extended to the axilla. The breast was removed, with part of the greater pectoral muscle. Glands, the size of peas, were dissected from the axillary vessels and from beneath the clavicle. The diagnosis was cancer. May 15, 1892, there had been no recurrence, but in the autumn of that year a recurrent nodule was "drawn" by an irregular practitioner. In April, 1893, she sustained a fracture of the hip. Later there was recurrence in both breasts, neck and abdomen. She died in August, 1893.

Case XXVII. This patient was thirty-five years of age, married, and with no important family or personal history. Her trouble appeared about six months ago without known cause, and at the time of operation existed as a hard lump in the breast, the size of a lemon. The nipple was not retracted, and enlarged glands could be felt in the axilla. January 16, 1890, the breast, with the pectoralis major — which was involved — was removed. A number of enlarged glands were removed from the axilla, which then appeared clean. The growth was cancer. She died February 1, 1891, having had no local recurrence.

Case XXVIII. This patient had a retracting growth of nine months' duration. She was fifty-four years of age, married, and her family and personal history were unimportant. Operation was performed on March 5, 1890, at which time she had an extremely fatty breast, with a small retracting nodule in the centre. Numerous small glands were felt in the axilla. The breast and axillary contents were removed, and the tumor found to be a scirrhus cancer. This patient suffered from local recurrence, and died in October, 1890.

Case XXIX. Operation on November 9, 1891. The disease had appeared three months before, without assignable cause, and had grown rapidly just before operation. The patient was fifty years old, married;

her family history was negative. At the time of operation the breast contained a nodular tumor as large as a goose-egg, with adherent skin, retracted nipple, and numerous enlarged glands in the axilla. The pectoral muscle was involved, and was removed with the breast. Glands were removed from the axilla. No pathological diagnosis was made. The patient died in May, 1892.

Case XXX. In this case there was no cause known for the appearance of the disease, which had existed for four months. The patient was married, about fifty years of age, and with a negative family history. There was a cancerous infiltration of the breast, with numerous small glands in the axilla. The usual completed operation was performed in February, 1892, and the breast and axillary contents removed. The diagnosis was medullary cancer; and she died October 14, 1892.

Case XXXI. This patient was married, sixty-six years old, and had lost a sister from cancer of the breast. She sustained a blow some time ago upon the breast now diseased, and four months ago noticed the growth. She was operated upon in October, 1892, and at that time there was a lump the size of an orange in the upper hemisphere of the breast. The breast was removed with the axillary contents, the tumor proving to be a medullary cancer. In June, 1893, recurrence was first noticed; and on May 22, 1894, she died of generalized cancer.

Case XXXII. Operated November 4, 1892. The patient was fifty years old, married, with a negative family history, and without any theory as to the cause of her complaint. There has always been a hardness near the nipple, and five months ago she noticed a lump, the size of a pigeon's egg, which has grown rapidly. At the time of operation there was a hard nodular mass, the size of an apple, in the upper inner quadrant of the breast. The skin and pectoralis muscle

were adherent, and the axillary glands were enlarged. The breast and both pectorals were removed, the axillary vein exposed and well dissected, and the axilla cleaned out. Microscopic examination showed the disease to be cancer. There was local recurrence in June, 1893; and the patient died in June, 1894.

Case XXXIII. A woman, sixty years old, married. Operated upon November 7, 1892. Her family history was negative, and there was no cause shown for the appearance of the disease, which began as a small lump thirteen months before, and had grown rapidly. She had a hard tumor as large as a hen's egg, movable on the muscle, the skin slightly adherent, and the nipple normal. No glands could be felt in the axilla. The breast and both pectorals were removed, and the axilla thoroughly cleaned of a chain of glands, not adherent to the vessels, but running up high in the axilla. The tumor was a cancer. In April, 1896, her son writes that there has been no recurrence of the growth.

Case XXXIV. A single woman of forty-five years, with a good family history, and knowing no cause for the disease, which appeared five months before the date of the operation. She presented a tumor in the outer hemisphere, with enlargement of the axillary glands. On January 1, 1893, the breast and both pectorals were removed and the axilla dissected. The tumor was a medullary cancer. She developed a recurrence on the outer side of the chest; and on November 26, 1894, Dr. Bolles removed several small nodules of cancer. She was last heard from in January, 1896, up to which time there had been no further recurrence, and she considered herself well.

Case XXXV. This patient was operated upon January 18, 1893, for scirrhus cancer of one year's duration. Her family and personal histories were unimportant. She had a tumor as large as an apple,

with retracted nipple, ulcerated skin, and enlarged axillary glands. The breast was thoroughly removed and also both pectorals, and the axilla cleaned out. She was last heard from on January 7, 1895, when she had recurrence in the scar, and a nodule in the liver.

Case XXXVI. A married woman of thirty-five, with a negative family history, was operated upon February 21, 1893. No cause was assigned for the tumor, which had appeared five years before. The tumor was as big as a goose-egg, not adherent to the skin, and the nipple was not retracted. A few glands could be felt in the axilla, but none above the clavicle. The breast and two infected glands high up in the axilla were removed, the pectorals not being touched. The disease was cancer. In May, 1895, she writes as follows: "No trouble except stiffness, which is growing monthly less." On February 28, 1896, reports herself well.

Case XXXVII. In this case the family history was bad, the patient's mother having died of cancer of the breast. The patient was fifty years of age, married, and had first noticed the disease only four weeks before operation. No cause was assigned for the occurrence of the malady. At the time of operation, April 18, 1893, she had a small nodule in the inner upper quadrant of the breast with a second, very small nodule under the nipple. One minute gland could be felt in the axilla. The breast was removed and the axilla dissected, the disease proving to be scirrhus cancer. She was heard from in April, 1896, and had had no recurrence.

Case XXXVIII. Operation on June 8, 1893. The patient was married, forty-two years old, and there was nothing in her family or past history to suggest a cause for the disease. At the time of operation the tumor had existed for a year in the right

breast, and for six weeks in the left, the latter being the smaller. Both breasts were removed, and the axillæ dissected, the disease in both being scirrhus cancer. Recurrence developed below and external to the right cicatrix; and she died in March, 1894, with lung metastases.

Case XXXIX. This patient was fifty-one years old, married, with a bad family history, and a medullary cancer which had developed in five months from a chronic mammary tumor. The skin was involved in the outer lower quadrant of the breast. On June 12, 1893, the breast was removed and the axilla dissected. The tumor proved to be a medullary cancer; and she died in March, 1894, with local recurrence and lung metastases.

Case XL. This patient was a married woman of sixty, with a good family history. Two years before the appearance of the trouble for which she consulted me she sustained a dislocation of her shoulder and fracture of the ribs. Two years ago the disease showed itself, and at the time of operation there was a nodule in the skin involving the upper outer quadrant of the breast, with some involvement of the axillary glands. The breast was removed and the axilla dissected on September 11, 1893. The disease was a scirrhus cancer, and when last heard from the patient was in excellent health, without recurrence. This was in October, 1896.

Case XLI. The disease in this case had existed for three months in a woman of fifty, with a negative family history, and no known cause for its appearance. The tumor was in the lower outer quadrant of the breast, and small glands were felt in the axilla. On January 1, 1893, the breast, with the pectoralis major, was removed and the axilla dissected. The growth was a disseminated medullary cancer. The disease recurred in the region of the original tumor six

months later; and in May, 1895, she was still living, with recurrence in the supra-clavicular region. She died June 9, 1895.

Case XLII. The father, sister, and three cousins of this patient died of cancer. The patient was a married woman of fifty-three. She had noticed retraction of the nipple for two years, and a tumor for three months. She was operated upon January 20, 1894, the tumor being then as large as a walnut, with no glands palpably enlarged in the axilla. The breast was removed in the usual manner, and the axilla thoroughly dissected. The pathological diagnosis was scirrhus cancer. This patient writes, under date of March 6, 1896, "Have no further symptoms of cancer."

Case XLIII. In this case the family history was negative, and there was no cause assigned for the occurrence of the disease. The patient was sixty-five years old, and single. At the time of operation the tumor had existed for eighteen months, and presented in the upper outer quadrant of the breast a nodule the size of a walnut with involvement of the areola of the nipple, and enlargement of the axillary glands. On January 30, 1894, the breast was removed, and the axilla dissected. The growth was scirrhus cancer. The wound never healed; and on July 20, 1894, the patient died.

Case XLIV. This patient was unmarried, fifty-two years of age, and her family and past history were negative. The disease in her case was of three months' duration, in the upper half of the breast, with enlargement of the axillary glands. On February 3, 1894, the breast, both pectoral muscles, and the axillary contents were removed. The tumor was a medullary cancer, and up to October, 1896, when she was last heard from, there had been no recurrence.

Case XLV. This case was operated upon February 8, 1894. The patient was single, fifty-seven years

of age, and her family history was negative. She ascribed her trouble to a sprain due to reaching upward. The disease had existed for five months as a nodule beginning in the skin and subsequently involving the outer upper quadrant of the breast with enlargement of the axillary glands. The breast and axillary contents were removed, and the tumor found to be scirrhus cancer. She died in August, 1895, of spinal cancer.

Case XLVI. The patient was seventy-two years old, married, and without any significant family or personal history. She had a tumor in the lower outer quadrant of the breast of six months' duration, with involvement of the skin, and enlarged glands in the inner margin of the axilla. On February 14, 1894, the breast, a portion of the pectoralis major, and the enlarged axillary glands were removed *en masse*. The microscope showed the disease to be medullary cancer; she died on the 9th of the following June with generalized cancer.

Case XLVII. This patient was operated upon on February 17, 1894. She was thirty-eight years of age, married, and without assignable cause for her trouble, or significant family history. Her disease was of seven months' duration, and had grown rapidly during the past two months. At the time of operation there was a nodule in the right breast, the size of a walnut, situated in the outer upper quadrant; the skin was slightly reddened and adherent, the breast enlarged and firmer than on the left, and with numerous enlarged glands in the axilla. The breast was removed, with the pectoral fascia, and the axilla was dissected. The disease was medullary cancer, with extensive axillary infection. There was recurrence one month later, and she died in about two months with involvement of the lungs.

Case XLVIII. This patient had noticed her

trouble for nine months, and gave a history of a blow upon the breast one year before. Her mother had cancer. She was fifty-six years of age, and single. At the time of operation there was a nodule in the upper hemisphere of the breast, and the axillary glands were affected. On July 20, 1894, the breast was removed, with both pectoral muscles, and the axilla was dissected. The disease was medullary cancer; and when last heard from, in October, 1896, there had been no recurrence.

Case XLIX. This patient was forty years of age, married, and without family or personal history of any significance. Seventeen months ago she noticed a lump, the size of a filbert, in the right breast. At the time of operation, October 3, 1894, the tumor was as large as a hen's egg, and the axillary glands were enlarged. The breast and both pectorals were removed, the axilla dissected, the clavicle divided, and the supra-clavicular glands removed. The breast and axillary contents showed epithelial growth in dense fibrous stroma. The supra-clavicular glands were not affected. In January, 1896, a nodule in the margin of the axilla, and one in the pectoral cicatrix were removed under cocaine anesthesia. The patient died on March 26, 1896.

Case L. This patient was operated on November 3, 1894, for a growth of six months' standing. She was forty years old and married. Her family history was negative, and no cause was assigned for the appearance of the disease. She had a tumor as large as a walnut in the inner lower quadrant of the breast; and the breast, with the axillary contents, was removed. The diagnosis was medullary cancer. August 23, 1895, a malignant nodule, the size of a pea, was removed from the pectoral margin of the axilla; and in October, 1896, a nodule had formed in rib.

Case LI. This patient had an abscess of her

breast twenty-three years before operation, and one year ago noticed a black spot in the scar. She was fifty-six years old, married, and had lost a sister by cancer of the breast. At the time of operation, December 15, 1894, there was a mass an inch square beneath the scar of the former abscess, and the nipple was involved. The breast and both pectoral muscles were removed, and the clavicle divided, no glands being found above it. The diagnosis was scirrhus cancer. When last seen, May 18, 1895, her general health was good, although a "sore" had opened twice and healed.

Case LII. This patient was forty-five years old, married, and with no significant facts in her family or personal history. At the time of operation the disease, which had existed for five months, appeared as a nodule beneath the nipple. There was a small gland in the axilla, which proved, however, to be not affected. On January 22, 1895, the breast and both pectoral muscles were removed, and the axilla dissected. The growth proved to be a scirrhus cancer in a chronic mastitis, with retention cyst. She was last seen by me in January, 1896, and had had no recurrence.

Case LIII. This case was operated on the same day as the preceding one, January 22, 1895. The patient was fifty-six years of age, married; and no family or personal history suggested malignant disease. Her nipple had been retracted for six years, but she had noticed a tumor for only three months. This, at the time of operation, formed a mass the size of a pigeon's egg above and to the outside of the breast, and there was one gland as big as a pea in the axilla. The breast and both pectoral muscles were removed, the axilla dissected, and the clavicle divided. The disease was cancer; and up to April, 1896, when she was last heard from, there had been no recurrence. The movements of the arm were normal.

Case LIV. This patient was forty-five years of age, married, and with a negative family history. Six years before the time of operation she fell from a horse, striking the affected side, and had noticed the present trouble for three years. There was a nodule beneath the nipple, with a few small glands in the axilla. On March 28, 1895, the breast and both pectoral muscles were removed, and the axilla dissected. The tumor was a scirrhus cancer, and when last examined by me, May 14, 1896, there had been no recurrence. Movements of the arm normal; pulling power a little weaker than before the operation. Well, October, 1896.

Case LV. Operation on April 3, 1895. The patient was forty-four years old, married, and with a negative family and personal history. Her disease had existed for six months, but had grown chiefly in the last six weeks. At the time of operation there was a mass, the size of a Messina orange, in the outer upper quadrant of the breast. The breast and both pectoral muscles were removed, and the axillary and supra-clavicular spaces cleaned of glands. The disease was medullary cancer. She had recurrence in the pectoral cicatrix, which was excised February 21, 1896, at which time two nodules were found in the skin and subcutaneous tissue. At the present moment, October, 1896, return in pectoral scar.

Case LVI. This patient was fifty years old, single, and had lost her mother by cancer. No cause was known for the occurrence of her own trouble, which had existed for only six weeks, and presented at the time of operation a nodule the size of a cherry in the upper inner quadrant of the breast. The lymphatic vessels and axillary glands were infiltrated with cancer. On August 24, 1895, the breast was removed, with a greater part of the pectoralis muscle. The axilla was dissected and the supra-clavicular space

explored. The pathological diagnosis was medullary cancer. In June, 1896, sternal and mediastinal gland removed. Well, September, 1896.

Case LVII. This patient was forty-nine years of age, married, and with a negative family history. No cause was assigned for the appearance of the disease, which at the time of operation existed as a nodule, the size of a large pea, in the breast, with a few enlarged glands in the axilla, those at the apex being normal. On September 24, 1895, the breast and pectoralis major were removed and the pectoralis minor dissected. The disease was scirrhus cancer, and up to November, 1896, there had been no recurrence.

Case LVIII. This case was operated upon October 19, 1895. The patient was married, sixty-six years of age, and without significant family or personal history. She had noticed the present trouble for three years, and at the time of operation there was a small hard mass in the upper hemisphere of the breast; the nipple was deeply retracted; the breast shrunken; and a small enlarged gland could be felt in the axilla. The pectoralis major was removed, the pectoralis minor divided, and the breast with the axillary contents removed *en masse*. The tumor proved to be an atrophying scirrhus cancer. She was examined by me, April 10, 1896; no recurrence.

Case LIX. Operation on November 25, 1895. The family history was negative. She ascribed her disease to pregnancy. The growth had existed for twelve weeks, a nodule forming one week after confinement, and appeared as a soft, fluctuating tumor in the upper outer quadrant of the breast, with hyperemia of the mammary and axillary regions, accompanied by high fever and frequent chills. The breast, axillary contents and pectoral muscles were removed *en masse*. The growth was medullary cancer. There was immediate recurrence, removal of infected skin two weeks later, and death in January, 1896.

Case LX. In this case the two great-grandfathers had cancer, and the patient had sustained an injury to her breast four years before the date of operation. The woman was fifty years old, married, and had noticed the growth for three and a half years. At the time of operation, December 27, 1895, there was a tumor as large as an egg in the upper outer quadrant of the breast, the nipple was retracted, and the glands in the axilla and above the clavicle were enlarged. The breast, both pectoral muscles, and the axillary contents were removed in one mass, and the disease found to be medullary cancer. Well, November, 1896.

Case LXI. This patient was single, thirty-eight years of age, and was operated upon January 3, 1896. The family history was negative, and no cause was assigned for the appearance of the disease, which had existed for one year. The tumor was in the upper outer quadrant of the breast, adherent to the skin and muscle, and the axillary glands were enlarged. At the operation the pectoral muscles, breast and axillary contents were removed in a mass, and the disease found to be medullary cancer, and rapidly returned.

Case LXII. This patient was sixty-three years old, married, and her family history was negative. No cause was assigned for the disease, which had appeared seven months before operation. She was operated upon January 27, 1896, at which time there was a lump, the size of a lemon, in the upper outer quadrant of the breast, and no glands were to be felt in the axilla. The axillary contents, pectoralis major muscle and breast were removed in a mass, and the pectoralis minor muscle was divided. The disease was medullary cancer, but the axillary glands were not infected. Patient reported herself well, September 11, 1896.

THE CLASSIFICATION OF BENIGN TUMORS OF THE BREAST.[1]

BY J. COLLINS WARREN, M.D., LL.D., BOSTON.

THE great frequency with which the breast is afflicted with cancer, makes any lesion of that organ a source of great anxiety to the patient and to members of the family. The importance, therefore, of a correct knowledge of all the growths of this region is such that it seemed to me that this subject would be a suitable one for one of the evening lectures of this winter's season.

The subject of this evening's lecture will therefore be a review of the different forms of tumor of the breast, more particularly the benign tumors, in order to prepare the way for the differential diagnosis between them and the malignant forms of disease of the breast.

In studying out this subject a little more exhaustively than I had hitherto done, I was struck with the lack of unison in the opinions of different writers on this subject. There seems to exist an imperfect knowledge of the pathology of the various diseases of the breast, more particularly the tumors, even among the writers of the highest authority. In going over the work, in sifting out the opinions of different authors, in summarizing them, and then in taking a general view of the whole situation, I think that I have arrived at conclusions which I should not have arrived at under any other circumstances.

[1] An Evening Lecture at the Harvard Medical School.

We will begin at the development of the gland, and trace somewhat briefly the earliest forms of development of the gland, the period of full maturity, and the gradual decline and atrophy of it in advanced life.

The mammary gland is, as you know, an appendage of the skin; as one writer has expressed it, a sort of highly specialized sudoriparous gland. It begins as a slight outgrowth of the rete Malpighii into the cutis vera in the early weeks of fetal life, and at the period of birth it has already formed a number of radiating ducts with pear- or club-shaped ends, some fifteen to thirty in number, radiating from the common point at which the outgrowth has started from the surface.

If we study the development in the embryo of mammals, we see some interesting features in the process of development which have a bearing on what we have to say about morbid growths later on. I have here three embryos of the pig of about one month's growth. An examination of the abdomen with a lens shows a faint continuous line running from the axilla to the groin on either side of the abdominal cavity, and, as the fetus grows, this line works up more nearly on to the front of the abdomen. The formation of the numerous udders, or of the mammary glands, takes place by a growth of this layer of the ectoderm, as it is called, and by a process of differentiation a thickening at three or four parts of the line occurs. Finally, we find that the line itself has disappeared, and in its place we have a row of nipples.

I have said that at birth the gland had a sort of stellate or radiating appearance, being composed of a series of ducts with pear- or club-shaped ends. An examination of them shows considerable activity within the tubes at the time of birth. There is a proliferation of the epithelium, a shedding of the epithelial cells and an accumulation of a certain amount of

granular *débris* in the interior of these ducts at birth. It almost seems as if there were something akin to an inflammatory process going on in the breast at this period. This activity in the epithelium produces a dilatation of the tubes, so that there is a sort of ectasia, and finally it is so marked that it becomes at the end of the first year a cavernous structure lined with a pavement epithelium. No material change in the appearance of the gland takes place after this until the age of puberty is reached, and then we find, of course, an increase of growth again in the gland, and we notice this condition not only in the female sex, but occasionally also in the male. I have been on several occasions consulted by mothers of young boys about fourteen years of age, for a distinct swelling and tenderness of the mammary gland coming on about the age of puberty.

Comparatively few acini are developed at the ends of the ducts and smaller tubes at this period.

Outside of the ducts and tubes we find the development of a hyaline connective-tissue stroma, having parallel bundles of fibres, which is quite a marked feature; and this basement stroma is distinctly different from the connective-tissue stroma of the gland proper itself. It is quite rich in nuclei, more or less transparent, and different in its nature from the ordinary connective tissue which we get in the stroma of the mammary gland — an interesting point to remember, because it again has a bearing upon the development of certain morbid growths.

The next stage in the development is the development of the acini, and this takes place by a sort of budding process, a growing out into the surrounding connective tissue; and here we get the physiological homologue of true adenoid tissue, that is, a new development of typical gland tissue, by a growing out of

little processes of epithelium, at first solid, and later containing spaces which represent a true gland growth. At the time of pregnancy this development of acini takes place at an enormous rate. After lactation is over the acini collapse, but they do not disappear; and of course they remain there to be distended again at the next period of lactation.

After the period of full maturity of the gland has passed, we come to the period of decline, which, of course, becomes more marked at the menopause; and we have there another important and interesting condition to study. We find then that the acini began to be absorbed and to disappear; and what we have finally left is merely an elongated tube which generally ends in more or less of a club-shaped extremity, and we have connected with the end histological structures which show the atrophied remains of previously existing acini of the gland. At this time also we often find a slight amount of desquamation of epithelium and granular *débris* in the interior of the tubes, as if this period of metamorphosis of epithelium was disturbed in its process of growth and decay, and was stimulated to a little greater activity at certain points than it had been before.

As the gland structures of the breast atrophy and disappear, connective tissue and adipose tissue come to take their place, and we finally have a breast containing merely the larger ducts, a small amount of fat and connective tissue, but little or no proper gland tissue.

I think that you will agree with me that there is a certain parallelism in the development of the breast, as I have sketched it, and in the development of the different types of tumor at different periods of life. In the first place, I have spoken of the condition of the mammary gland at birth, and later on at the period

of puberty, the great development of the gland, the peri-acinous and peri-tubular growth of the hyaline connective tissue, etc.; and we sometimes find that development occurring in a precocious and somewhat exuberant way, and the condition which is known as infantile hypertrophy illustrates that peculiar condition of the gland. I have here a photograph of a child with fully developed breasts and quite well developed figure, whose age at the time the photograph was taken was two years and seven months, a case kindly placed at my disposal by Dr. Marcy. The sexual instincts of the child were strongly developed. Another unusual form of development of the mammary gland is a condition known as gynecomastia. that is, development of a female breast in the male. Williams represents such a breast in a well-formed young man, and Henry describes the case of a man who had very well-formed breasts, and who assisted his wife to suckle a family of eight children.

I have here the photograph of such a case. This man evidently exhibited himself as half man and half woman. He has allowed the hair on one side of the body to grow and on one side of the lip. It is evident that he is a typical example of gynecomastia, having the ordinary figure of the man in every respect except in regard to the right breast.

Another form of malformation is that known as polymastia. and all I have to do is to recall to you the development of the milk line in the pig and in the lower mammalia to show how it comes about that this condition of polymastia or multiple breast occurs in certain cases. In this diagram I have indicated the line which you have seen, the milk line, and where the nipples would be likely to occur perhaps in the lower mammalia and possibly in man's earliest ancestors, as Williams has indicated in his monograph on the breast.

Cases of breasts upon the thigh and back, of supernumerary nipples in these localities have been quoted, but it is probable that the majority of supernumerary breasts develop themselves along this line; and we see here in this case, which is an example not only of polymastia, but of diffuse hypertrophy, that we have the development of supernumerary gland tissue along just that line, and if we could have lifted up that breast in the photograph a little bit, we should have found beneath it a supernumerary nipple. This patient came under my observation at the hospital a year or two ago, when she was at about the middle of her pregnancy. The photograph was taken at that time. The second photograph was taken about the time of confinement in the lying-in hospital. After the confinement had taken place the breasts diminished very greatly in size. Dr. Anthony, of Bradford, afterwards took her through a second confinement, and found renewed enlargement of the breasts and subsequent subsidence. In her second confinement she was allowed to nurse the child, and the breast secreted an abundance of milk.

Diffuse hypertrophy is a condition which this patient also serves to illustrate, but really a more typical example was that which I have represented in my work on surgical pathology and which was published by Professor Porter in the "Proceedings of the American Surgical Association," where the breasts were much more largely developed, and where he succeeded in removing by amputation both the breasts very successfully. The anatomical condition of diffuse hypertrophy of the breast seems to differ in different individuals. In some cases it appears to be simply an increase in the amount of glandular tissue. In other cases it seems to be an increase in certain constituent parts of the mammary tissue; and in the

case of Dr. Porter, which was examined by Dr. Whitney, there was an interstitial growth giving rise to that cystic type of breast disease which we shall speak of presently, so that there seems to be a certain amount of tumor formation in such breasts. In the second case to which I have just alluded there did not seem to be any lobular growths which indicated any such form of growth, but a general diffuse enlargement of the breast — gigantism, if we may say so, of the mammary gland.

Now we will take up more characteristically tumor-like growths of the gland, and attempt to trace the analogy between them and the changes seen in the mamma at the different stages of its development and decline. I shall speak first of fibroma of the gland, which comes in the early period of the life-history of the adult mammary gland; and then of the cysto-adenoma of the gland, which comes in the period of the full development of the acinous portion of the gland, the more strictly glandular structures; and finally, about the cystic degeneration of the gland, which comes in the period of senile change and decline.

First, in regard to fibroma. If you remember, I called your attention to the fact that at the age of puberty there was a growth of hyaline tissue about the tubes and lobules of the gland. Fibroma of the gland, according to Billroth, is developed from that structure. These tumors appear in early life shortly after the period of puberty. There are two forms of fibroma, the solid and the cystic. In the solid forms, where there are no cysts, the average age is said to be about twenty-three years, and in the cystic forms about twenty-six years.

I will speak first of the cystic, which is, perhaps, the most common and most characteristic. I have

here a diagram of that growth stained with a double stain of eosine and hematoxylin. The epithelium is stained purple, and the fibrous tissue pink; and we see in between these long slits, which are so characteristic of the cystic fibroma, or intra-canalicular papillary fibroma as it is sometimes called, this hyaline tissue. With the active growth of this tissue there is a stretching and distortion of the ducts of the glands, the acini having been but very imperfectly developed at that period of life, and these long narrow slits are thus developed. We see but little glandular structure in such tumors. These tumors reach about the size of an egg or a little larger, are more encapsuled, and when excised do not, as a rule, recur. They are generally single, but sometimes multiple. I saw yesterday a young lady operated upon three years ago for a tumor of this kind of the right breast, and find that she has another of the same character growing in the left breast. She is now about twenty-one years old.

Gross speaks of a solid fibroma of the breast, and I presume he refers to the little hard lobular tumors, about the size of a walnut, which Sir Ashley Cooper has described as "chronic mammary." We make a section and we find none of the slits. We find a few fragments of gland-tissue, and in the interstices between the gland structure dense fibrous tissue. This is a comparatively harmless growth, does not become inflamed, increases to the size of a walnut and there remains. The patient experiences a little pain and tenderness at the period of the catamenia, but otherwise has no trouble. Lately, at the hospital, I had the opportunity of examining such a tumor which had been twenty years in the breast of a woman who came for another affection entirely, and she said she had experienced no trouble from it whatever.

We come next to a form of tumor which has to do

more particularly with the gland structures of the breast; and here we find a tumor growth more distinctly in the middle period of life, the average age being about forty-three. Here we find very distinctly gland structures existing, and this is a section taken from one of these growths kindly prepared by Dr. Whitney and drawn by Mr. Kaula. You see these growths are somewhat polypoid or villous, and they have been called villous papilloma by some authors, and cystic adenoma by others. They are full of little spaces more like acini than tubes, though sometimes they become more oval and elongated like tubes and are lined with a layer of epithelium. It is evident that these tumors grow from small acini and very small ducts of the gland. They develop in different ways, according to different authors. Billroth suggests that there is a very active growth of epithelium, and quite a number of acini develop in which the epithelium afterwards breaks down and leaves cysts of considerable size. The stroma of the gland takes a comparatively small part in the development of the tumor; and so we see little of the connective tissue as compared with the great mass we see in the fibroma of the gland. Sometimes these cysts develop to a very great size; and here is one of the most marked types, which was removed at the hospital a few days ago, and we see one of these villous tumors developing in it.

Gross has almost denied that there is such a thing as true adenoma of the gland. He is very strict in his definition of what adenoma should be. He has seen, he says, but two examples of it himself, and has only eighteen examples of pure adenoma on record. I think that he has attempted to isolate too completely the gland structure from the other structures of the breast. You see that in so complicated an

organ as the breast, when one part grows the other must grow to certain extent, and we get complicating and confusing pictures somewhat difficult to interpret; but if we hold fast to the point of origin of the growth we do not have that difficulty. If we hold to the acinus growth in the cystic adenomas, we shall have an ample explanation of the peculiar papillary character of the growth, which is not a papilloma any more than its surroundings oblige it to be, and therefore we should properly classify this as a true form of adenoma, modified of course to adapt itself to the structure in which it grows. This form of tumor appears at the time when the acini are in a most active stage of development, that is, in the forties. It is a softer tumor than the fibroma, and does not grow much larger. One of the characteristics is a sanious discharge from the nipple. We can understand how that would occur in vascular growths; by the breaking-down process we should have little hemorrhages which would cause discharge from some neighboring excretory duct.

I pass by the lipoma, chondroma and osteomas of the gland as extremely rare forms of tumor, and tumors which have nothing in particular to do with the mammary gland, and come to the kind of tumor, or more properly disease, which we find in the declining stage of the gland; in that stage when the acini become atrophied and are replaced by connective tissue, and the tubes are somewhat dilated towards their extreme ends into club-shaped dilatations, and are lined with a somewhat thickened and desquamating layer of epithelium. The gland going through this process of atrophy, with substitution of connective tissue and fat for active gland structures, this disturbance of epithelium may easily become so altered in certain parts as to disturb the regular process of

involution, and consequently constriction of the ducts leads to the formation of cysts. Now these cysts may be either single, confined to one lobe of the gland and growing to the size of a walnut, or they may permeate the whole of the gland. This is cystic degeneration, as it is sometimes called — a condition which exists probably in a slight degree in the majority of declining breasts. Some pathologists call this condition, of which I have an example here, chronic mastitis with retention cysts. This is a breast split open to show the whole interior of the gland; and you see here the whitish mammary tissue and these little cysts full of greenish material, and some again quite large, and as in this case so extensive that the whole breast had to be removed on account of the complete degeneration which had taken place. Some authors think this is a form of cysto-adenoma but there is no development of the glandular structures, as it belongs to the period when the parenchyma of the gland is atrophied and in a quiescent state, and when the gland itself is in a state of involution; and therefore it is to be looked upon rather as a degenerative process than an actively developing one. These cysts occur at about the time that malignant disease develops, and consequently they are the subjects of great solicitude to the patients suffering from them; but the characteristic symptom is the presence of a large number of little pea-like bodies diffused over the gland, sometimes in one breast, and sometimes in both breasts, accompanied with considerable pain, caused by a hyperesthesia of the nervous filaments going to them.

I should like to say a word about the treatment of these cysts. When there is a single cyst a puncture will sometimes suffice for a cure, as the cyst will collapse and never fill again; but where the disease is more extensive and involving the whole of the gland,

then it is perhaps necessary to remove the whole or portions of the gland. If the cysts do not enlarge, they may be allowed to remain, as they will probably give no trouble and many such a breast can be saved from the knife if a correct diagnosis is made. Why should these cysts have this peculiar color? The walls of the cyst being in a state of glandular irritation, the epithelium breaking down, the vessels become thrombosed through hyperemia or perhaps constriction of their lumen, and little extravasations of blood take place, and we have hematoidin crystals and granules of fat and broken-down tissue that give them this peculiar appearance.

An affection which is likely to be mistaken for this is one known as mastodynia or neuralgia of the breast. That sometimes accompanies this cystic degeneration of the breast, and sometimes is entirely independent of it. I think we see it at times with a certain amount of hyperemia, and perhaps a temporary enlargement of the breast without any actual structural change. These cases are extremely hard to manage, the patients becoming hypochondriacal; but the pain is usually not accompanied by any serious disease.

I have not said anything of chronic mastitis of the breast. I have left that to the last not to have it confused with any of the other affections mentioned. We may have an inflammation of the breast, and a chronic as well as an acute one. I shall say nothing about the acute inflammations. The chronic form is one which may occur and be accompanied by a considerable growth of connective tissue such as we have in the cystic degeneration. In chronic mastitis we find great growth of the interstitial tissue and destruction of the glandular structures. Billroth represents, and Williams copies from him, a form of shrinking mastitis which has all the appearance of

atrophying scirrhus. Occasionally we do have a chronic inflammatory process of the breast going on to destruction of the breast. It may occur in early as well as late life. I remember a nursery maid who came to me twenty years ago with a lump in the breast. I removed it, and found no trace of malignant disease. I made the diagnosis of chronic mastitis. Presently she appeared with a similar lump in the other breast and I explained to her that she had not anything which it was necessary to remove.

Nevertheless, she had it burned out afterwards by a caustic process. She is still, so far as I know, in robust health. I think such cases are not very common, but they are to be taken into account in making a diagnosis of malignant disease of the breast.

I have not time to speak of tuberculosis or cold abscess of the breast. I think I have said enough to give you perhaps a little more intelligent idea of the origin of benign tumors of the breast and of the different types which we may expect to find at different periods of the life history of that organ.

58 Beacon Street, February 1, 1897.

S. J. PARKHILL & CO., PRINTERS
BOSTON